

5. *Notes on the Ethiopian Pentatomoidea. X. Some specimens from southern Africa in the South African Museum, with a note on the remarkable pygophore of Elvisura irrorata Spinola and description of a new species of Piezodorus Fieber.* By D. LESTON, F.Z.S., F.R.E.S. (With 17 text-figures.)

By courtesy of the Director and Dr. A. J. Hesse, I have examined a collection of previously undetermined Shieldbugs belonging to the South African Museum, Cape Town. Most of the specimens were taken at localities within, or adjacent to, the Union.

The literature contains not a few references to the fauna of South Africa; the pioneer workers were Palisot de Beauvois, Thunberg and Germar. The first important work is that of Stål (1865); in the first volume of *Hemiptera Africana* he collated all the earlier records and placed them in recognizable modern genera. Later, Stål (1876) brought his classification up to date and the broad outlines of generic and higher taxonomy in use to-day are entirely due to this great Swedish entomologist.

It is only in later works that localities are given with sufficient precision to form a basis for zoogeography, and these works include Wallengren (1875); Distant (1892, 1898); Schouteden (1912); Schumacher (1913); Hesse (1925, 1935) and Leston (1952*a*, 1952*b*). Besides these, new species from the area are described in papers by Bergroth, Distant, Montandon, Jensen-Haarup, Schouteden and Leston, as well as in the catalogues of Westwood, Dallas and Walker. Solely to aid further knowledge of the distribution of species, the following list is given.

BRACHYPLATIDAE Lest., 1952*a* (*Plataspidae*)

*Gelastaspis browni* Kirk.

1902. Kirkaldy. Entomologist. xxxv, p. 166

Umtali, Southern Rhodesia (A. Bodong)

CYDNIDAE Billberg, 1820

*Legnotus tibialis* Stål

1853. Stål, *Ofv. Vet. Ak. Forh.*, x, p. 222

M'fongosi, Zululand, iv-v, 1934, xii-ii, 1934-5, v, 1935 (W. E. Jones)

*Legnotus melaleucus* (Thunb.)

1783. Thunberg, *Nov. Ins. Sp.*, ii, p. 50

Kamieskroon, Namaqualand, ix, 1930 (South African Museum staff)

PENTATOMIDAE Leach, 1815

SCUTELLERINAE Leach, 1815

SCUTELLERINI Leach, 1815

The nomenclature and classification of the *Scutellerinae* have recently been investigated (Leston, 1953a, 1953b); as a result, the groups *Scutellerini* Leach, *Sphaerocorini* Stål and *Elvisurini* Stål are now treated as subtribes within *Scutellerini*. All three subtribes occur in the Union of South Africa.

*Elvisura irrorata* Spinola

1837. Spinola, *Essai Hém.* p. 359

Karkloof (now: Kloof), Natal, xii, 1915 (Bell Marley)

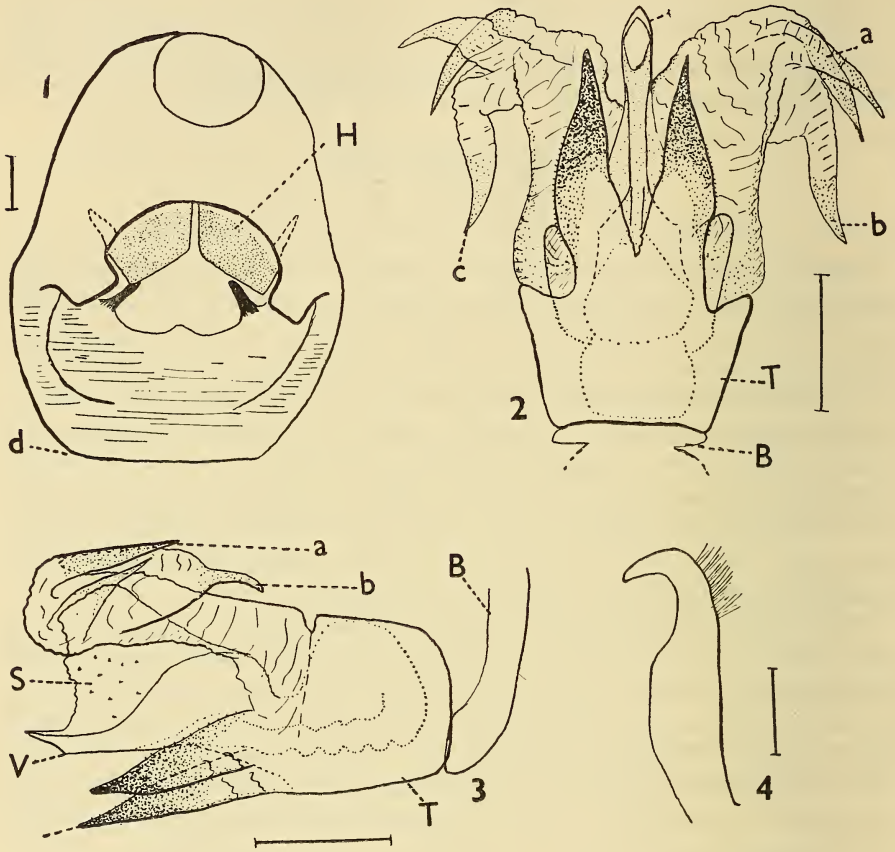
This was a female, but through the courtesy of the British Museum (Nat. Hist.) authorities I have been able to examine the genitalia of a male of this rarity. The genus is distinct from all other *Scutellerinae* in that the scutellum is distinctly keeled and the bugs have a marked resemblance to Buprestid beetles.

The male genitalia are shown in figures 1-4. The pygophore is large with a well-developed caudal lip: the cephalad margin is remarkable for the presence of a pair of large, flat, rectangular and freely movable flaps attached immediately within the margin; they appear to be adherent throughout their length but with a root-like attachment at their outer corner. The flaps are very thin but sclerotized, with a pale band along the proximal border; the distal border is fringed by a few fine hairs (not shown in the figure).

In work now in progress on the Angolan Pentatomid fauna a pair of movable pieces has been found on the internal-lateral margins of the pygophore in *Crollius* Dist.; they were triangular and large so that, when brought together in the resting position, they completely covered the pygophoral opening. Dr. R. I. Sailer of the U.S. National Museum has informed me, *in litt.*, that he has discovered similar processes on the pygophore of other *Podopini*, including *Podops* Lap.; he proposes to call them *hypopygeal appendages*. It is probable that the hypopygeal appendages are homologous in the Podopid genera with the flaps noted in *Elvisura irrorata*; thus it is proposed to adopt this term for the structures noted in *E. irrorata*, but the difference in position of the appendages in the two groups must, of course, be stressed; it is not a major difference presenting insuperable difficulties in homology. A difficulty is met, however, in assessing its taxonomic import; is it a primitive character? The little known of the life-histories of *Podops* and of *Elvisura* suggests quite different ecological roles so that structural convergence is hardly to be considered seriously.

The theca of *E. irrorata* (figs. 2 and 3) is strongly sclerotized and short; it is quite impossible for the vesica and conjunctival appendages to be retracted (a constant character in the *Scutellerini*). Ventrally there projects a pair of appendages, third conjunctival appendages in Singh-Pruthi's terminology; they are sclerotic except towards the base, where they fuse, and are thus freely movable. On the dorsal surface of the theca project the fused first and second conjunctival

appendages. As in all other *Scutellerini*, the second is more sclerotized while the first is membranous except for the tips. The first conjunctival appendages are apically bifid and terminally sharp. The principal difference to be noted in the



*Elvisura irrorata* Spinola

1. Pygophore from above. H, hypopygeal appendages; p, posterior margin.
2. Aedeagus, ventral. B, basal plates; T, theca; V, vesica; a, b, c, first, second and third conjunctival appendages.
3. Aedeagus, lateral. S, supravestibular process.
4. Paramere, lateral.

Scale = 0.5 mm.

appendages of *Elvisura* from those of other genera is the large size of the common basal area of the first and second conjunctival appendages. The third pair of appendages are covered, sparsely, by minute points.

The vesica exhibits the usual basal convolutions and well-developed ejaculatory reservoir while the gonopore is oblique and large: these are all common characteristics of the *Scutellerini* but, in addition, the external part of the vesica

supports a rigid, densely sclerotized, thin and rough-edged vertical lamina. This structure has also been noted in *Steganocerus multipunctatus* and (Leston, 1953*b*) termed the supravescical process. It is flecked in *E. irrorata* by a few minute broad-based spines and whereas in *S. multipunctatus* the supravescical process is somewhat thick and terminated at its highest point forwards by a bifurcation, in *E. irrorata* it is thin and simple anteriorly, albeit very ragged at the margins.

As in most *Scutellerini*, the actual path taken by the ductus seminis remains untraced due to the density and complexity of the vesica; the basal plates have not been studied nor figured except merely to show their attachment.

The parameres are simple hook-like pieces with a ridge of hairs; they take a form common to many *Scutellerini*.

Thus the entire male genitalia of *E. irrorata* is of the usual *Scutellerinine* pattern as described elsewhere (Leston, 1953); it differs in possessing (1) a supravescical process similar to that found in *Steganocerus* and (2) a pair of movable processes on the pygophore which are tentatively homologized with the hypopygeal processes of certain genera of *Podopini*.

*Cryptacrus comes* (Fabr.)

1803. Fabricius, *Syst. Rhyngotorum*, p. 130

Amatongas Forest (between Umtali and Beira); the specimen is of  
var. *apicalis* Dist.

PACHYCORINI Dallas, 1851 (*Tetyrini*)

*Deroplax circumducta* (Germar)

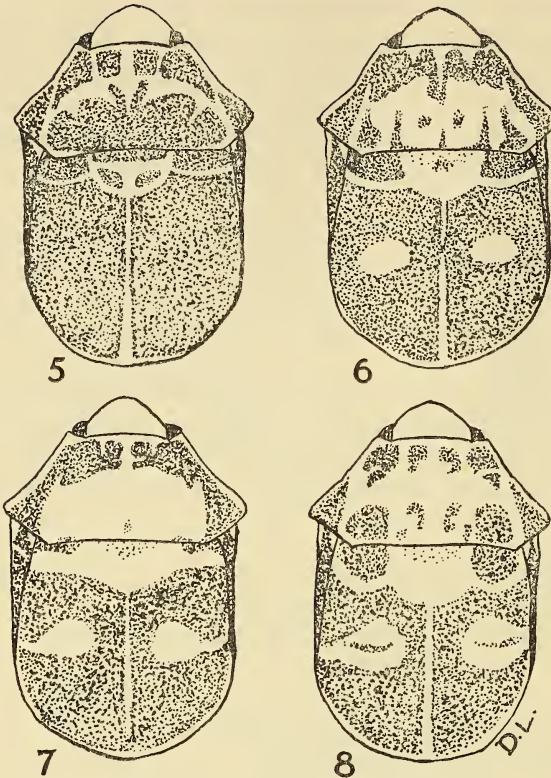
1837. Germar, *Rev. Ent.* (Silbermann), v, p. 190

Vryburg, Bechuanaland, 1904 (Jones); Otjtundua (160 miles north-west of Outjo), South West Africa, ii, 1926 (S. Afr. Mus. Exp.). The South West African specimen is close to *D. nigropunctata* (Stål), but I am unable to distinguish between these two species. They must remain distinct pending an examination of Stål's type.

*Deroplax silphoides* (Thunb.)

1783. Thunberg, *Nov. Ins. Sp.*, ii, p. 29

Pretoria, Transvaal, x, 1944 (R. Wilson). This specimen is similarly marked to a long series in the British Museum from Nyasaland. It is referred to the variable *D. silphoides*. Figs. 5-8 depict the range in variation; it is considered undesirable to add further to the number of named varieties of this species. The male genitalia have been examined (figs. 9-12); they are similar to the genitalia of *D. circumducta* figured elsewhere (Leston, 1953*b*) and quite unlike the genitalia of *Scutellerini*. The pygophore encloses a wide proctiger which is marked by a pale band near the base. The aedeagus, shown laterally in fig. 9, encloses a long filamentous vesica of the 'penisfilum' type in Baker's terminology (Baker, 1931). Surrounding the vesica is a long, finger-like extension of the conjunctiva. The first and second conjunctival appendages only are present



*Deroplax silphoides* (Thunb.). 5-8. Variation  
in a variety from Nyasaland.

(the third is always present in *Scutellerini*); they are, as usual, joined basally. The first pair is long and membranous, terminating in a lightly sclerotized point; the second is biramous, sclerotized, with one arm produced into a filiform process extending to the apex of the vesica. The parameres are shown in two views (figs. 11, 12); the head bifurcates and is closely spinose. On the dorsum of the parameres is a tubercle carrying an armature of bristles while the basal area of the tubercle is similarly armed. It should be noted that figures 9 and 10 are somewhat diagrammatic.

AMYOTINAE Lest., 1953a (*Asopinae*)

*Dorycoris pavoninus* (Westw.)

1837. Westwood, *Cat. Hemipt.*, coll. Hope, i, p. 39

Stellenbosch, iv, 1932 (P. v. Heerden). The specimen is of a form near to var. *fuscus*.

PODOPINAE Dallas, 1851 (*Graphosomatinae*)

This subfamily includes the two tribes *Podopini* Dallas and *Tarisini* Stål (*Graphosomini* auctt.). How far it is a natural assemblage remains for future investigation to elucidate, but while the *Podopini* are reasonably homogeneous the *Tarisini* are certainly not so and probably many of the species are *Pentatominae*.

*Bolbocoris rufus* (Westw.)

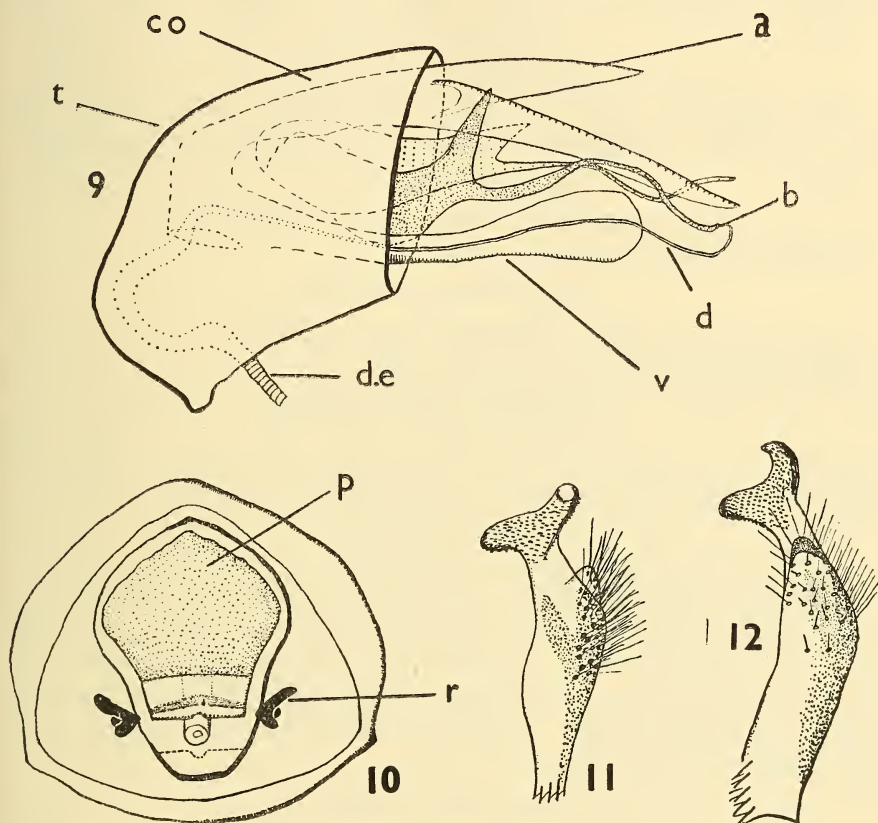
1837. Westwood, op. cit., i, p. 12

Kamanyab, S.W.A., iii, 1925 (S. Afr. Mus. Exp.); Kaross (30 miles NW of Kamanyab), S.W.A., ii, 1925 (S. Afr. Mus. Exp.). Despite the widespread

distribution of two of its species the genus *Bolbocoris* is centred in South Africa, with at least five species in the Transvaal.

PENTATOMINAE Leach, 1815

This enormous subfamily is overdue for revision, but until this has been attempted the Stålian groups are retained.



*Deroplax silphoides* (Thunb.)

9. Aedeagus, lateral. t, theca; co, conjunctiva; a, b, first and second conjunctival appendages; d, ductus seminis; v, vesica; d.e, ductus ejaculatorius.  
 10. Pygophore, terminal. p, proctiger; r, right paramere.  
 11, 12. Two views of right paramere.

PENTATOMINI Leach, 1815

*Menida lythrodes* (Germar)

1837. Germar, *Rev. Ent.* (Silbermann), v, p. 175

Letaba, Transvaal, v and xii, 1945 (E. C. G. Bedford). 'From orange-tree—fed on red-scale and on orange.'

*Menida decoratula* (Stål)1853. Stål, *Ofv. Vet. Ak. Forh.*, x, p. 222

Kaoko Otavi, S.W.A., iii, 1926 (S. Afr. Mus. Exp.).

*Menida distanti* Horvath1892. Horvath, *Term. Füzet*, xv, p. 258

Louis Trichardt, Transvaal, i, 1928 (R. F. Lawrence); Bulawayo, Southern Rhodesia, v, 1917 (R. W. E. Tucker); Mtunzini, Zululand, vi, 1940.

*Agonoscelis puberula* Stål

1853. Stål, op. cit., x, p. 216

Outjo, S.W.A. (S. Afr. Mus. Exp.); Potgietersrust, Transvaal, iv, 1934 (R. F. Lawrence); Upington, Cape Province, vii, 1936 (S. Afr. Mus. staff).

*Agonoscelis odendaali* Dist.1910. Distant, *Ann. Mag. Nat. Hist.*, (8), vi, p. 95

Salisbury, Southern Rhodesia, v, 1913.

*Agonoscelis erosa* (Westw.)

1837. Westwood, op. cit., i, p. 33

Outjo, S.W.A., i, 1926 (S. Afr. Mus. Exp.).

*Amphimachus circumflexus* (Stål)

1855. Stål, op. cit., xii, p. 182

Florida, Transvaal, x, 1918 (R. W. E. Tucker). No locality was given by Stål; the majority of specimens seen come from the Transvaal.

*Antestia lymphata* Kirk.1909. Kirkaldy, *Cat. Hemiptera*, i, p. 129Salisbury, Southern Rhodesia. This specimen has been reported upon elsewhere (Leston, 1952c); it is distinct from the coffee-bugs and these have been removed to *Antestiopsis* Lest. *A. lymphata* Kirk. appears to be extremely rare; the British Museum possesses only Dallas's original type and paratype, described by him as *Pentatoma maculata*. The South African Museum's specimen is the first to have a precise locality.Gen. *Piezodorus* Fieber1861. Fieber, *Europ. Hem.*, lxx, p. 3291905. Jakovlev, *Rev. russe Ent.*, v, p. 142 (*Pausias*)*Pausias*, type *Piezodorus martini* Put., is only distinguishable from *Piezodorus* in that the spiracles are pale, whereas in the latter they are dark; *P. hessei* has pale spiracles, but in all other respects it is a true *Piezodorus*. These conditions are best satisfied, as are the zoogeographical factors, by sinking *Pausias* (Syn. Nov.).When dealing with a large number of specimens from many parts of Africa it has been found that the usual taxonomic characters: length of ventral spine, shape of mesosternal carina, antennal ratios, etc., give little help in separating species. The separation of *P. pallescens*, *purus*, and *hybneri* can probably only be based on the genitalia of the males, but the degree of variation in the parameres

needs further investigation. It appears that the three might best be considered as facets of a single polytypic species; the zoogeography has not helped in this group and ecological factors are probably the cause of the different 'species'.

*Key to the African (south of the Equator) species*

The only other species reported from the area is *P. bequaerti* Schout. from the Belgian Congo.

- |  |                   |
|--|-------------------|
| 1. Spiracles pale. Length over 11 mm.  | <i>hessei</i>     |
| Spiracles dark. Length less than 11 mm.  | 2                 |
| 2. Posterior tibiae usually flattened. Second antennal segment always longer than third. | <i>purus</i>      |
| Posterior tibiae not flattened. Second antennal segment equal to or shorter than third.  | 3                 |
| 3. Parameres as in fig. 16.  | <i>hybneri</i>    |
| Parameres more elaborate.  | <i>pallescens</i> |

*Piezodorus purus* (Stål)

1853. Stål, op. cit., x, p. 221

Kaoko Otavi, S.W.A., iii, 1926; Warmbad (12 miles SE. of Zesfontein), Kaokoveld, S.W.A., ii, 1925; Outjo, S.W.A., i, 1926; Kamanyab, S.W.A., iii, 1925; Kaross (30 miles NW. of Kamanyab), S.W.A., ii, 1925 (all S. Afr. Mus. Exp.).

Keimoes and Riemvasmak, Gordonia, Cape Province, vii, 1925 (K. H. Barnard); Aughrabies Falls, Kenhardt Div., Cape Province, v, 1934 (R. F. Lawrence); Murraysburg District, Cape Province, iii, 1931 (Mus. staff).

The determination of *Piezodorus* species is a matter of some difficulty; the species are variable and the Oriental *hybneri* (Gmel.), now spread over much of East and Central Africa, has been confused with *purus* by authors. The genitalia are very similar throughout the genus.

Fig. 13 shows the aedeagus of *purus* laterally; the conjunctival appendages are very large and almost entirely membraneous; it has been found difficult to homologize them with the appendages in other groups. The head of the paramere (fig. 14) enables this species to be distinguished from both *hybneri* and *pallescens* (Germ.). The latter is also a common species in South Africa.

*Piezodorus hessei* sp. nov.

♀. Pale yellow-brown, a red band across the pronotum between the postero-external angles, ante-ocular area of head red; a black metallic line just within and parallel with the lateral paraclypeal margins. Hemelytra with a brown speck on the apex of the median margin of the clavus. Antennae indefinitely reddish. Venter pale yellow-brown, spiracular eminences pale dirty-yellow.

Pronotum and head punctate, the former with its anterior margin raised and rounded, its lateral margins straight, reflexed and yellow. Elytral texture thin, semi-transparent. Membrane glassy, colourless. Antennal segments 0.42, 1.00,

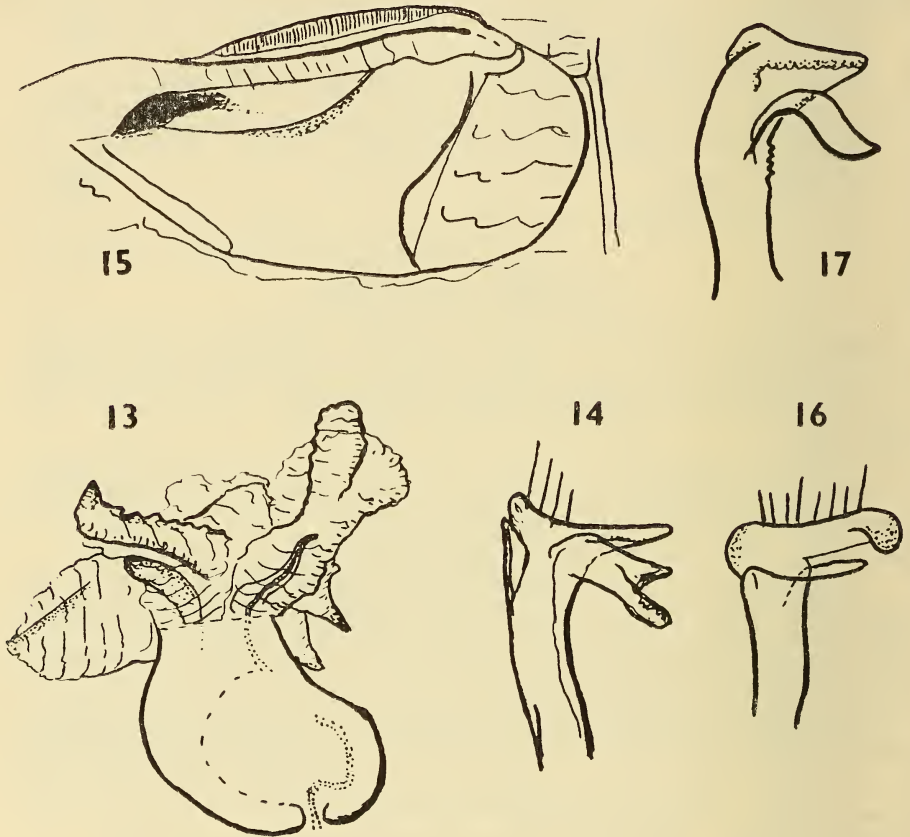


1.16, 1.11 and 1.01 mm. long respectively. Ventral spine stout, reaching to before the intermediate coxae.

♀ Length 12.4 mm. Maximum pronotal breadth 6.2 mm.

♂ Length 11.8 mm. Maximum pronotal breadth 6.2 mm.

Holotype ♀: Otjikondo (40 miles WNW. of Outjo, S.W.A., 1, 1925 (S. Afr. Mus. Exp.).



*Piezodorus purus* Stål. 13, aedeagus, lateral. 14, head of paramere, lateral.

*Piezodorus hessei* sp. nov. 15, metathoracic gland opening, and evaporatorium.

*Piezodorus hybneri* (Gmel.). 16, head of paramere, lateral.

*Piezodorus hessei* sp. nov. 17, head of paramere, lateral.

Paratypes: Three ♂♂ same locality as holotype; one ♀ Kaoko Otavi, Kaokoveld, S.W.A., iii, 1926; one ♂ Otshu, Hoarusib River (50 miles W. of Kaoko Otavi), S.W.A., iii, 1926; one ♂ Kaross (30 miles NW. of Kamanyab), S.W.A., ii, 1925 (all S. Afr. Mus. Exped.).

Holotype and paratypes in the South African Museum except for one paratype presented to the British Museum (Nat. Hist.), and two retained in the author's collection.

*Gynenica capeneri* Lest.1953. Leston, *Rev. zool. bot. Afr.* (in press)

M'fongosi, Zululand, i, 1935 (W. E. Jones). This species appears to be confined to Natal and Zululand.

*Gynenica marginella* Dallas1851. Dallas, *List. Hemipt. Brit. Mus.*, i, p. 181

Resolution, Grahamstown, Cape Province, i-iv, 1928 (Miss Walton).

*Stenozygum alienatum* (Fabr.)1803. Fabricius, *Syst. Rhyngotorum*, p. 173

Wankie, Southern Rhodesia, xi, 1923 (C. W. Tyler).

*Boerias brunnea* Jensen-H.1931. Jensen-Haarup, *Ent. Medd.*, xvii, p. 325

Knysna, Cape Province, i, 1931 (K. H. Barnard). The previously known localities for this species are given by Leston (1952b); it is confined to the south-west of the Cape Province.

*Boerias maculata* (Dist.)

1910. Distant, op. cit., (8), vi, p. 87

Warrenton, Cape Province, iv, 1931 (J. T.). Not previously recorded from the Cape Province, but known from Southern Rhodesia, the Transvaal, and Basutoland.

*Boerias rubrocincta* (Dist.)

1910. Distant, op. cit., (8), vi, p. 87

Pretoria, Transvaal, v, 1927 (S.M.); Smithfield, O.F.S., 1910 (Kanne-meyer), 'On orangia'. These two records considerably extend the published distribution. Distant described the species from Natal.

*Boerias victorini* (Stål)

1856. Stål, op. cit., xiii, p. 194

[*nec* Jeannel, 1913]

Keurbooms River, Knysna, Cape Province, i, 1931 (K. H. Barnard).

*Durmia haedula* (Stål)1865. Stål, *Hemipt. Afric.*, i, p. 149

Louis Trichardt, Transvaal, i-ii, 1928 (R. F. Lawrence).

*Durmia tomentiventris* (Germ.)1837. Germar, *Rev. Ent.* (Silbermann), v, p. 168

M'fongosi, Zululand, i-ii, 1935 (W. E. Jones).

*Carbula litigatrix* Kirk.1909. Kirkaldy, *Cat. Hemipt.*, i, p. 88

M'fongosi, Zululand, i, 1935 (W. E. Jones); Cayimaais (Caimaiais, 25 miles SE. of Zesfontein), Kaokoveld, S.W.A., iii, 1925 (S. Afr. Mus. Exp.).

*Veterna sanguineirostris* (Thunb.)1822. Thunberg, *Hemipt. Rostr. Cap.*, ii, p. 41890. Distant, *C.R. Soc. ent. Belge*, xxxiv, p. lv (*mimica*)1892. id., *Naturalist in Transvaal*, p. 250 (*patula*)

I can find no constant characters upon which to separate *V. patula* Dist. and *V. mimica* Dist. from this species; they are weak but geographical subspecies; *sanguineirostris* centred in the Cape Province, *patula* in the Transvaal, Natal, and Southern Rhodesia, and *mimica* in the Belgian Congo. (Syn. Nov.)

Subspecies *sanguineirostris*

Somerset West, Cape Province, viii-ix (A. J. Hesse).

Subspecies *patula*

Pretoria, Transvaal, xi, 1930.

*Diploxys fallax* Stål1865. Stål, *Hemipt. Afric.*, i, p. 129

M'fongosi, Zululand, i, 1935 (W. E. Jones).

*Coponia waterbergensis* (Dist.)1902. Distant, *Ann. S. Afr. Mus.*, ii, p. 252

Louis Trichardt, Transvaal, i-ii, 1928 (R. F. Lawrence). The specific distinctions are obscure in this genus but the specimen before me has been compared with Distant's type. Undoubtedly *C. cornuta* (Dist.), *C. thoracica* (Dist.) and *C. waterbergensis* are very closely allied, and their differences, based on the pronotal angles, are scarcely specific.

*Lerida punctata* (P. de Beauv.)1805. Palisot de Beauvois, *Ins. Afr. Amer.*, p. 84

M'fongosi, Zululand, i, 1935 (W. E. Jones).

*Farnya versicolor* (Dist.)1881. Distant, *Proc. Zool. Soc. Lond.*, p. 271

Junction of Marico and Limpopo Rivers, Transvaal, iii, 1887. (A. W. Eriksson.) This was collected by the celebrated explorer-collector; it is the first Transvaal record. Elsewhere (Leston, 1952a) I have reported its capture in Natal.

*Aethemenes stalianus* Kirk.1909. Kirkaldy, *Cat. Hemipt.*, i, p. 47

Bindura, Southern Rhodesia (D. Coghill).

*Antestiopsis orbitalis* (Westw.) (Comb. Nov.)1837. Westwood, *Cat. Hemipt. coll. Hope*, i, p. 35

Michell's Pass, Ceres, Cape Province, x, 1934 (Museum staff).

*Halydicoris corticinus* (Germ.)

1837. Germar, op. cit., v, p. 178

Pretoria, Transvaal, ii, 1930 (I.B.K.); Port St. Johns, Cape Province (G. Shortridge); Schuiverberg, Transvaal.

## PHYLLOCEPHALINI Dallas 1851

Amyot and Serville introduced the name Phyllocephalides for this group, but being vernacular it is invalid. The first Latin group name is Dallas's *Phyllocephalidae*.

*Dalsira projecta* (Dist.)

1898. Distant, *Ann. Mag. Nat. Hist.* (7), ii, p. 303  
'Transvaal'.

*Dalsira subtruncata* (Walker)

1868. Walker, *Cat. Heteropt. Hemipt. Brit. Mus.*, iii, p. 491  
Letaba, Transvaal, xi, 1948.

## HALYINI Spinola, 1850

*Atelocera notatipennis* Stål

1858. Stål, *Ofv. Vet. Ak. Forh.*, xv, p. 312  
Moroqueng (Morokwen), Bechuanaland, 1905; Vryburg, Bechuanaland, x,  
1939 (Mus. staff).

*Atelocera natalensis* Stål

1853. Stål, *op. cit.*, x, p. 216  
Northern Damaraland, i, 1888 (A. W. Eriksson).

## AEPTINI Stål, 1876

*Aeptus singularis* Dallas

1851. Dallas, *List. Hemipt. coll. Brit. Mus.*, i, p. 146  
Louis Trichardt, Transvaal, 1, 1928 (R. F. Lawrence).

## MYROCHEINI Stål, 1876

*Delegorguella atomaria* (Dallas)

1851. Dallas, *op. cit.*, i, p. 136  
Vryburg, Bechuanaland, i-ii, 1930 (C. G. Stone).

*Neococalus clausus* (Walker)

1867. Walker, *Cat. Heteropt. Hemipt. coll. Brit. Mus.*, i, p. 175  
Acornhoek, East Transvaal, xi, 1918 (R. W. Tucker); Port St. Johns, Cape  
Province; Willowvale, Eastern Cape Province, 1, 1917.

## DINIDORINAE Stål, 1870

*Coridius nubilis* (Westw.) (Comb. Nov.)

1837. Westwood, *op. cit.*, 1, p. 25  
Pretoria, Transvaal, iii, 1932; Vrededorst, O.F.S., 1902; Port St. Johns, Cape  
Province, 1902 (G. Shortridge); Kakamas, Kenhardt Div. v, 1934 (R. F.  
Lawrence).

## REFERENCES

- Distant, W. L., 1892, *A naturalist in the Transvaal*, London.
- id., 1898, 'Rhynchota from the Transvaal, Mashonaland and British Nyasaland', *Ann. Mag. nat. Hist.*, (7) 2: 294-316.
- Hesse, A. J., 1925, 'Contributions to a knowledge of the fauna of S.W. Africa. iv. A list of the Heteropterous and Homopterous Hemiptera of S.W. Africa', *Ann. S. Afr. Mus.*, xxiii: 1-190.
- id., 1935, 'Scientific results of the Vernay-Lang Kalahari expedition, March to September, 1930', *Ann. Transvaal Mus.*, xvi: 581-603.
- Leston, D., 1952a, 'Notes on the Ethiopian Pentatomoidea, v. On the specimens collected by Mr. A. L. Capener, mainly in Natal', *Ann. Mag. nat. Hist.*, (12) 5: 512-20.
- id., 1952b, 'Notes on the Ethiopian Pentatomoidea. vi. Some insects in the Hope Department, Oxford', *Ann. Mag. nat. Hist.*, (12) 5: 893-904.
- id., 1952c, 'Notes on the Ethiopian Pentatomoidea. i. The genotype of *Antestia*', *Rev. zool. bot. Afr.*, xlv: 268-70.
- id., 1953a, 'The suprageneric nomenclature of the British Pentatomoidea', *Ent. Gaz.*, iv: in press.
- id., 1953b, 'Notes on the Ethiopian Pentatomoidea. viii. Scutellerinae Leach of Angola, with remarks upon the male genitalia and classification of the subfamily', *Publ. Cult. Comp. Diam. Angola*: in press.
- Schouteden, H., 1912, 'Cimicidae, Coreidae, Reduviidae de la région du Zoutpansberg (Transvaal)', *Rev. zool. Afr.*, ii: 101-14.
- Schumacher, F., 1913, 'Ein Beitrag zur Kenntnis der Rhynchoten-Fauna Südafrikas, insbesondere von Deutsch-Südwestafrika, Klein-Namaland und dem Kalaharigebiet', *Schultze, Reise, v (Denkschr. med. Ges. Jena, xvii: 49-88)*.
- Stål, C., 1865, *Hemiptera Africana*, i, Stockholm.
- id., 1876, 'Enumeratio Hemipterorum, v', *K. Svensk Vet.-Ak. Handl.*, xiv (4): 1-162.
- Wallengren, H. D. J., 1875, 'Insecta Transvaaliensia—Bidrag till Transvaalska Republikens i Sodra Afrika insektfauna', *Ofv. K. Vet.-Ak. Forh.*, xxxii (1): 83-137.